

WHAT EPA SHOULD KNOW ABOUT Natural Gas Infrastructure Readiness for gas fired
Electric Utilities

EPA Oil & Gas Team Presentation

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Experience

13 years at APPA);

7 years oil/gas sector (including 15 months in pipelines);

11 years in manufacturing advocacy;

Private consulting to power sector, steel related manufacturing & oil/gas

NERC Voluntary Expert on Single Point of Disruption Study (SPOD) on gas storage and
electric utilities

Consulting to LNG for domestic storage

Detailed gas infrastructure or public power

2017 Gas Infrastructure Paper

Designed and wrote part of 2010's APPA study-still relevant (detailed analysis done by
Katie Elder of Aspen)

[http://www.publicpower.org/files/PDFs/ImplicationsOfGreaterRelianceOnNGforElectricityGe
neration.pdf](http://www.publicpower.org/files/PDFs/ImplicationsOfGreaterRelianceOnNGforElectricityGeneration.pdf)

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Take Away From This Briefing

Gas-fired electric utilities and gas infrastructure are more heavily connected than
coal-fired power plants to their coal mines or railroads since natural gas cannot be
stored;

EPA needs to understand the connection between these two industries when regulating
NSPS 111 (b) (d) for power and OOOOa for "existing sources"

Utilities need to know as much about natural gas infrastructure (storage, compressor
stations, pipelines) and THOSE segment regulations to understand electric reliability;

Electric utilities face \$1 million dollar a day penalties for failing to meet NERC
reliability standards;

Gas storage may be the biggest infrastructure issue for utilities and often completely
ignored;

Gas storage may affect electric utility reliability in some locations if a local
bottleneck;

Utilities find local opposition to gas pipelines for real estate value and public

health concerns (real or feared);

EPA dispersion modeling may limit gas units in permitting even if replacing coal;

Opposition to compressor stations due to blowdown noise & mercaptan smell; and

PHMSA, EPA & state regulations on pipelines may create some short term repairs that may create some unpredictable downtime that MIGHT affect gas deliverability.

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August 15 Trump Administration NEPA Exec Order for New Pipelines, Compressor Stations, LNG--positive

Positive step toward coordination across agencies with specific policy and timing requirements;

NEPA EO positive for upstream, midstream (pipelines) and electricity transmission projects (utility corridors)

Gives CEQ/DOI lead on all NEPA EIS reviews, studies with accountability;

CEQ, DOI and Gen. Services Admin. (GSA) to coordinate on manpower, staffing & budget to accomplish streamlined NEPA process;

CEQ to take actions in the next 40 days to implement; and

Increased use of OMB's Dashboard to monitor progress on various NEPA reviews

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FERC Has Quorum But NEPA Questions Remain After Sierra Club Decision

Does this court case mean all GHGs? Or did they mean CO2 & Methane?

Will FERC issue case by case determinations on NEPA or issue a FERC Policy to answer EIS/EIA on downstream impacts of GHGs under NEPA?

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Nat Gas Generating Capacity

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Predictions of Coal Plant Retirements

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Florida as Example Of Gas Dominance

When Will Utilities Build More Gas Plants?

Electric load is still flat in most regions

Push for Renewable Energy in

>20 states with RPS standards;

Customer pressures for renewables;

Utility CEOs face tough decisions if state PUCs or laws address subsidies for nuclear plants in subsidized for dispatch or if state regulatory agencies attempt to repeat any of the "environmental dispatch" in the Clean Power Plan in state NSPS/ESPS regulations.

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Natural Gas Infrastructure May Pose a Bottleneck In Early Transition Years in Some States

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300,000 MI OF EXISTING PIPELINES MOSTLY SERVING UPSTREAM OIL/GAS
NOT PIPELINES ENOUGH FOR NEW NGCC

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Natural Gas Storage Is Often Ignored and May Cause Localized Reliability Issues For
SOME Gas Plants

Few new gas storage projects planned due to economics- a gas glut & lack of economic
incentives;

Many current storage fields may have surplus but may not have ability to move gas to
power sector quickly based upon morning nomination or re-inject quickly if gas is not
needed;

Pipelines don't store natural gas-line packing works for factories but not larger power
plants;

Impacts of PHMSA Interim Final Rule, Dec, 2016, on storage safety, security & new
requirements-how many of >300 gas storage locations must be under repair and for how
long;

Trump Admin. retained PHMSA Interim Final rule but delayed enforcement for 2 years;

Industry associations have said they need up to 10 years to implement gas storage
changes;

Unknown how many storage fields/wells/salt domes designed similarly to Aliso Canyon
(where about 30 wells have not been approved to return to operation)

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Natural Gas Storage "Deserts" Needed for Gas Generation

Pipelines cannot always be line packed adequately for larger power plants;

Gas moves 25-40 miles per HOUR- some plants 6-9 hours from storage;

Many states have geology unsuitable for gas storage;

Dec. 2016 DOE Report suggested storage facilities were old and needed massive updates-
power sector to plan for "dual fuel" (oil);

Unrealistic expectation that oil units can be run as "dual fuel" during April-Sept in
ozone nonattainment areas; some fuel handling units aren't up to date; SPCC spill regs
may not be implemented for oil handling (manmade berms etc.); limits on sequential
running time of oil units (ex. <10%)

Solid blue states indicate states where subsurface GAS storage is not possible due to
geology

Source: Aspen Environmental

Gas Storage Projects Can Be Stopped By States or FERC

Arizona natural gas storage project declined by state water agency in approximately
2008 due to proximity to sole source aquifer near Tucson;

FERC declined Tres Palacios & Leaf River

Some projects withdrawn due to market changes

Expect water storage issues to be brought up by environmentalists and water utilities
(private and municipal)- not just in west

In post Aliso Canyon world-getting natural gas storage locations newly permitted might

be tough

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DOE's October 2016 Storage Report Following Aliso Canyon Leak Is Significant

"Power system planners and operators need to better understand the risks that potential gas storage disruptions create for the electric system." Sec. Ernest Moniz, DOE, October 2016;

44 Policy Recommendations and suggestions for new PHMSA regulations;

DOE report recommended Dual Fuel for power sector until storage facilities have been retrofitted and meet many dozens of new requirements; and

Associations for natural gas industry stated that they needed more than 1 year for storage facilities to meet PHMSA's new safety regulations effective Jan. 2018

HOW LONG DO THEY NEED FOR REPAIR OF STORAGE FACILITIES? UTILITIES SHOULD KNOW THE STATUS OF INTEGRITY TESTING ETC OF STORAGE PROVIDER BEFORE DECIDING TO CLOSE COAL PLANT

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Dual Fuel Sounds Like a Silver Bullet for Power Sector But...

Dual fuel (oil) limited by Clean Air Act often to <10 percent of total year;

Dual fuel (oil) not allowed during summer ozone season

Some Title V permits only allow dual fuel (oil) when Governor or FEMA issues emergency orders (flooding, tornado, hurricane, ice storms)

Some "dual fuel" units were permitted that way thirty years ago but not maintained SPCC requirements & integrity testing;

Electric utilities that have kept up oil units may need special permits or variances for localized natural gas infrastructure issues (Find out what is needed in advance); and

\$TICKER \$HOCK to burn oil

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LNG for Above Ground Gas Storage Solution Where Subsurface Geology Won't Work?

Use brownfields or former military facility plants possible outside Gulf of Mexico region in upper Midwest

Use LNG Terminals with surplus capacity along East coast, FL, Midwest

Cost for 3-5 day gas supply at smaller LNG?

Look at importing Canadian gas to smaller LNG serving as storage in Midwest

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EPA's Upcoming Decisions on Compressor Stations & Pipelines and Why Timing of Methane Repairs Matter to Utilities

EPA's NSPS for new source pipelines & compressor stations built after Sept. 18, 2015- so most coal fired power plants converting to gas would need new lateral pipelines and perhaps compressor station to serve;

Some flanges, hatches & valves take a week, month or occasionally a year to repair;

Pipeline/compressor station-no service during significant repair time unless they have secondary routing for methane gas (rare);

Many power plants won't have access to multiple pipelines unless in oil/gas producing

state; and

Many pipelines serving power sector don't (yet) have secondary pipeline routing and electricity costs go up for gas if they pay for secondary routing-might put coal plants back "in money"

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Timing for Fugitive Compressor Stations/Pipeline Leaks Might Affect A Utility's Localized Reliability & Costs

Compressor stations located approximately every 80 miles;

Each compressor station has an average of 1,500 parts that can at some point leak;

Typical leak repairs require 1 day, week or 1 month;

Evacuate gas on up to 5 miles of pipeline in all directions of NEW compressor stations;

A few compressor station leaks require up to 1 year for replacing valves-but where are they??;

If a power plant is being served by compressor station or pipeline that is taken out of commission due to PHMSA or EPA regulations requiring repairs this could be a short term concern unless the pipeline has multiple routing (Similar to rail issues).

Some pipeline repairs following LDAR can reach into existing pipelines depending upon configuration

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Noise & Smell Issues at Compressor Stations May Come up in Permitting Process

Address concerns about noise with community upfront even if pipeline company doesn't;

Find out about secondary routing of methane to avoid service disruptions for power plant and those costs;

Will methane smell like mercaptan? Does your community want that smell for safety signal or find it offensive (don't make assumptions)

See/Hear YouTube video at:

<https://www.youtube.com/watch?v=WtSH5V1YQvQ>

Yellow arrow is a line of residential community close to pipeline compressor station

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Gas Conversion Challenges Are Not Insurmountable

Permitting process is far slower now;

Infrastructure opposition ranges from property value losses, smell, noise, and public health;

Natural gas is a preferable fuel source when contemplating CO2;

Dual fuel may require special Fed EPA or state air pollution agency approvals for use during natural gas infrastructure force majeure events;

Gas compressor station repairs mean station out of service for 5-21 plus days-bigger disruption risk if no natural gas storage or secondary pipelines nearby;

Possible localized reliability issues; and

Belts and Suspenders: more gas storage in key states may be needed if pipeline projects to deliver to power plants are delayed or stopped.

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Looking Ahead for NGCC-Related Regulations

NGCC need space for steel catalysts (formaldehyde MACT); (not a big deal compared to MATS)

Gas chromatographs for watching for variances in gas quality if localized infrastructure options are limited (know your supply- similar to knowing coal blending);

Possible electrification of pipeline compressor station motors (replace gas motors) in ozone nonattainment areas (NESCAUM wants all electric);

Gas v. electric motors decisions should balance safety, spark suppression, electric reliability, air pollution controls, and last priority LOAD for power sector.

2018 PHMSA Safety Regulations may mean more repairs and replacement of infrastructure.

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